KRATOM GOLDEN LEAF IS THREATENED
A Strategic Analysis of the Geopolitical and Pharmaceutical War Against Indonesia's Kratom Industry

Executive Summary

This strategic intelligence report presents an in-depth analysis of the coordinated threat facing Indonesia's natural kratom industry. Based on the Nawa Śāstra Triwikramā hermeneutical analysis framework, this report identifies a systematic campaign launched by pharmaceutical industry interests and Western regulatory bodies. This campaign is executed through a "Trojan Horse" strategy: the introduction of highly potent and dangerous semi-synthetic 7-hydroxymitragynine (7-OH) products into the market, which are then used to create a moral panic. This deliberately engineered crisis is then erroneously blamed on the much safer natural Indonesian kratom leaf.

The ultimate objective of this operation is multifaceted:

(1) To eliminate Indonesia's natural kratom industry—a sovereign, unpatentable commodity worth hundreds of millions of dollars—from the global market.
(2) To create a regulatory justification for a total ban on the natural product, thereby clearing the market of competitors.
(3) To pave the way for the introduction of a new generation of patented synthetic opioid drugs, developed from kratom alkaloids, allowing pharmaceutical corporations to capture the entire economic value previously enjoyed by tens of thousands of Indonesian farmers.

This report dissects each layer of this threat, from the ethnobotanical and economic analysis of kratom in Indonesia, the scientific and forensic deconstruction of synthetic 7-OH products, and the tracing of decades-long pharmaceutical research, to an analysis of the information warfare tactics that use regulatory bodies and mass media as instruments. The report concludes with a series of strategic recommendations designed to defend Indonesia's economic sovereignty and genetic resources in the face of this asymmetric war.

PART I

Kratom Nusantara
Cultural Heritage and Economic Pillar

To understand the scale of the threat, it is essential to first map the fundamental reality of kratom as an Indonesian national asset. Far from the negative narrative constructed in the West, kratom (*Mitragyna speciosa*) is an integral part of ethnobotanical heritage, a pillar of the grassroots economy, and a strategic export commodity that positions Indonesia as a dominant player in the global market. The analysis in this section is based on the pillars of "Knowledge" (pure indigenous science) and "Economy" (welfare based on wisdom) to firmly define what is at stake.

1.1. Ethnobotanical Roots and Traditional Significance

The history of kratom use in Southeast Asia, particularly in Indonesia and Malaysia, spans centuries.[1] The plant has been traditionally used by rural communities, especially laborers and farmers, as a mild stimulant to increase stamina and endurance while working under the hot sun.[3] Additionally, kratom has been used as an herbal remedy to relieve pain, fever, diarrhea, and various other minor ailments.[2]

In a cultural context, kratom is not merely a functional plant but also holds a social role. In some communities, kratom is consumed during social gatherings and rituals, serving as a medium to strengthen communal bonds.[5] This understanding is crucial because it places kratom within the framework of local wisdom (*ethnoscience*), not as a "narcotic" or "dangerous psychoactive substance" as narrated by Western regulatory bodies. This reduction of meaning is the first step in the process of delegitimization, a common tactic used to erode sovereignty over local natural resources. By changing the perception from "traditional herbal medicine" to "dangerous drug," the door for external intervention and control is opened.

1.2. The Economic Engine of Rural Indonesia

The kratom industry has become a vital economic engine for Indonesia, especially in the rural areas of Kalimantan. Indonesia is the de facto largest single supplier of kratom in the world, controlling up to 96% of total kratom imports into the United States market, which is the largest consumer market.[6] This dominance gives Indonesia significant economic bargaining power.

The export value of kratom shows extraordinary economic potential. Reports mention an export value reaching USD 350 million.[6] Data from the Central Statistics Agency (BPS) also shows a positive trend, where from January to May 2023, the export value of kratom reached USD 7.33 million, an increase of 52.04% compared to the same period the previous year.[7] In February 2025,

Indonesia even recorded its first export of processed kratom after the implementation of new trade regulations, with a shipment of 351 tons of product valued at USD 1.053 million to the United States and Europe.[7]

However, the true significance lies in its socio-economic impact at the grassroots level. In provinces like West Kalimantan, especially in the districts of Kapuas Hulu and Ketapang, tens of thousands of farming families depend on kratom cultivation for their livelihood.[4] The industry creates jobs, supports small and medium-sized enterprises (SMEs) involved in processing, packaging, and distribution, and serves as the backbone of the local economy.[5] Thus, any attack on the kratom industry is not just an attack on an export commodity, but a direct assault on the social stability and welfare of tens of thousands of Indonesian citizens.

1.3. Natural Botanical Profile

Scientifically, the natural kratom leaf is a complex botanical product. The leaf contains more than 40-50 different types of alkaloids that work synergistically.[3] Of all these compounds, the most abundant alkaloid is mitragynine (MG), which is the main component in the dried leaf.[1]

The most fundamental scientific fact, and the core of the entire argument in this report, is the content of 7-hydroxymitragynine (7-OH). In naturally grown and unprocessed kratom leaves, 7-OH is a minor alkaloid. Its concentration is extremely low, consistently reported as less than 2% of the total alkaloid content in the leaf.[13] This fact is non-negotiable and has been repeatedly verified in scientific literature. This fundamental difference in concentration is the clear line of demarcation between safe, natural kratom products and dangerous, synthetic derivative products—a distinction deliberately obscured by interested parties.

1.4. Internal Dynamics: The Voice of Farmers and Domestic Challenges

In provinces like West Kalimantan, especially in the districts of Kapuas Hulu and Ketapang, tens of thousands of farming families depend on kratom cultivation for their livelihood.[4] The industry not only creates direct employment for farmers but also supports an ecosystem of small and medium-sized enterprises (SMEs) involved in processing, packaging, and distribution, serving as the backbone of the local economy.[5] However, these internal dynamics also face challenges. Reports indicate instances of misuse targeting vulnerable groups in border areas, illegal extraction of active substances, and covert marketing in tourist areas like Bali and Lombok.[4] These domestic challenges, while real, are fundamentally different from the engineered crisis in the West and require a prudent internal governance approach, not a ban motivated by external pressure.

A deep analysis of kratom's position as an Indonesian asset shows that the narrative built in the West is a form of perception warfare. By ignoring the cultural context, downplaying the economic significance, and deliberately obscuring scientific facts, a legitimate agricultural commodity is being reclassified as a public threat. This move is not based on science, but on geopolitical

strategy. The goal is to seize control of a market currently dominated by Indonesia. By successfully labeling kratom as a "dangerous narcotic," Western powers can justify regulatory interventions like import bans, which would effectively cripple the Indonesian industry and transfer market control to entities under their jurisdiction: pharmaceutical corporations. This is a modern manifestation of economic neo-colonialism, where regulation is used as a weapon to conquer the economic sovereignty of another nation.

PART II

The Trojan Horse
Deconstructing the "Contamination" of the Kratom Market

The central thesis of this report is that the "kratom crisis" currently under the spotlight in Western countries is not a naturally occurring phenomenon, but an engineered one. This engineering is accomplished through the infiltration of new products that are vastly different from the traditional kratom leaf. These products, containing extremely high concentrations of 7-hydroxymitragynine (7-OH) and produced semi-synthetically, function as a "Trojan Horse." They are deliberately released into the market to create severe public health incidents, the impact of which is then falsely generalized to stigmatize and destroy the reputation of the entire kratom market, including natural leaf products from Indonesia. This section will dismantle that strategy by dissecting the forensic, scientific, and market evidence.

2.1. The Emergence of a New Threat: Concentrated 7-OH Products

In recent years, the U.S. consumer market has been flooded with a wave of new products marketed under labels such as "7-OH," "7OHMZ," or "enhanced kratom."[17] These products come in formats highly appealing to casual consumers and young people, such as gummies, tablets, candies, energy shots, and even imitation ice cream cones.[13] These products are aggressively sold over-the-counter in easily accessible locations like gas stations, smoke shops, and convenience stores, often with little to no accurate information about their effects and risks.[13]

The most fundamental difference between these new products and natural kratom lies in the concentration of 7-OH. As established, natural kratom leaf contains less than 2% 7-OH.[13] In contrast, these semi-synthetic products can have a 7-OH concentration of up to 98%.[19] Some "enhanced kratom" products have even been found to contain 7-OH levels 500% higher than what would be naturally expected.[22] Forensic analysis of various commercial products sold on the market has confirmed this practice of adulteration, where products are intentionally enriched with 7-OH in amounts far exceeding what is naturally possible or achievable through normal drying processes.[15]

2.2. The Scientific Impossibility of "Natural" Concentration

The narrative that these high-concentration 7-OH products are the result of a more potent "natural extract" is a scientific falsehood. Given that 7-OH exists only in trace amounts in the leaf, attempting to extract it directly from plant material in large quantities for commercial production is impractical and economically unfeasible.[13] The process would require tons of kratom leaves just to produce a few grams of pure 7-OH, making the final product price prohibitive.

The unavoidable logical and scientific conclusion is that the high concentration of 7-OH in these new products is the result of semi-synthetic production. This process most likely involves the chemical oxidation of mitragynine, the main alkaloid which is far more abundant in the kratom leaf.[13] Mitragynine is extracted and then chemically converted in a laboratory into 7-OH. This means these products are not botanical extracts, but industrial chemical products fundamentally different from their source material.

2.3. The Documented Danger: The True Source of the Crisis

The surge in reports of serious health incidents and calls to poison control centers in the United States coincides with the proliferation of these concentrated 7-OH products. A report from the Texas Poison Center Network, for example, shows a sharp increase in exposure cases to kratom or 7-OH products, with the majority of calls related to concentrated 7-OH products occurring in recent months, many of which required treatment at a healthcare facility.[19]

The documented health risks from these concentrated 7-OH products are severe and consistent with opioid overdose. Symptoms include agitation, confusion, rapid heart rate, high blood pressure, difficulty breathing, extreme drowsiness to the point of unconsciousness, seizures, and respiratory depression (breathing that slows to a stop), which can be fatal.[19] This is a real danger created by a new industrial product, not by the traditional kratom leaf.

To clarify this fundamental difference, the following comparison table is presented as an irrefutable reference tool.

Table 1: Comparative Analysis: Natural Kratom Leaf vs. Concentrated 7-OH Products

Attribute	Natural Kratom Leaf	Concentrated 7-OH Products
Source	Mitragyna speciosa plant	Semi-synthetic from mitragynine
Key Alkaloids	Complex mixture of >40 alkaloids, dominated by Mitragynine	Isolated 7-Hydroxymitragynine (7-OH), often with other byproducts like mitragynine pseudoindoxyl [17]
7-OH Content	Very low (<2% of total alkaloids) [13]	Very high (can reach 98%) [19]
Production Method	Agricultural (drying and grinding of leaves)	Industrial chemical process (oxidation of mitragynine) [13]
Potency (vs. Morphine)	Mitragynine has lower potency than morphine	7-OH has up to 13 times the potency of morphine [13]
Regulatory Status (FDA View)	Considered an unapproved new dietary ingredient and an unsafe food additive [16]	Considered a potent and dangerous new opioid; target of enforcement actions [21]
Primary Documented Risks	Mild side effects (nausea, constipation); Risk of contamination (heavy metals, salmonella) if not	Severe opioid-like effects: respiratory depression, seizures, addiction, withdrawal syndrome, and death [19]

	processed properly [16]	

The strategy behind the introduction of concentrated 7-OH products can be analyzed as a calculated "poison pill" maneuver. The natural kratom market has grown steadily for years, creating a loyal consumer base and a strong supply chain from Indonesia.[6] Previous attempts to ban kratom directly, such as the DEA's proposal in 2016, failed completely due to fierce public and political resistance.[28] This failure indicated that a new, more cunning strategy was needed. By introducing a genuinely dangerous new product deceptively marketed under the "kratom" name, the perpetrators created a predictable public health crisis. The serious incidents caused by this "poison pill"—the synthetic 7-OH product—are then exploited by regulators and the media to justify an attack on the *entire* product category, including the much safer natural leaf. This gives them the public crisis they previously lacked to overcome political opposition. It is a classic Trojan Horse operation in the arena of regulation and public health.

PART III

The Threat Engine
The Pharmaceutical Pursuit of Patentable Opioids

Behind the scenes of the regulatory war and media narrative, there is a powerful driving engine with a clear economic motive: the relentless pursuit by the pharmaceutical industry and Western research institutions to develop a new class of patentable opioid analgesics. This pursuit has been ongoing for decades, long before kratom became a public issue. The kratom leaf, with its unique pharmacological profile, is seen not as a traditional herb, but as a molecular blueprint for the next "miracle drug"—a potent opioid with fewer side effects. This section will uncover this massive commercial motive, which is the primary fuel for the campaign to annihilate its natural competitor: the Indonesian kratom industry.

3.1. The "Holy Grail" of Pharmacology: Atypical Opioids with Minimal Side Effects

The main attraction of kratom for the pharmaceutical industry lies in the unique pharmacology of its alkaloids. Unlike classic opioids such as morphine, heroin, or fentanyl, kratom alkaloids, especially mitragynine and 7-OH, are classified as "atypical" or "biased" agonists.[25] This refers to their mechanism of action at the cellular receptor level.

The key scientific discovery is that these compounds activate the mu-opioid receptor via the G-protein signaling pathway (which produces the analgesic effect), but they do not significantly recruit the β-arrestin-2 pathway.[13] The β-arrestin-2 pathway is believed to be responsible for most of the most dangerous and undesirable side effects of opioids, including respiratory depression (the main cause of overdose death), severe constipation, and the rapid development of tolerance.[25]

This "biased" profile makes kratom alkaloids a "prototype compound" or "holy grail" for drug researchers. They see the potential to engineer these molecules into new pain relief drugs that have a potency equal to or even exceeding morphine, but without the risk of death from respiratory arrest. The market potential for such a drug, in the midst of an opioid crisis that has killed hundreds of thousands in the United States, is worth trillions of dollars. This is an enormous economic incentive to control and monopolize the chemical technology derived from the kratom plant.

3.2. Mapping the Research-to-Patent Pipeline

Scientific interest in kratom alkaloids is not a new phenomenon. Its trail can be traced back for several decades. The compound 7-OH was first described in the scientific literature in 1994.[13] Early studies to synthesize it from mitragynine appeared as early as 2002.[34] Patents and scientific publications have detailed various methods for the semi-synthetic production of 7-OH, often using

oxidizing reagents like *[bis(trifluoroacetoxy)iodo]benzene* (PIFA) or *Oxone* to convert mitragynine into 7-OH.[3]

This research effort is not sporadic work, but a coordinated, concentrated, and well-funded program by leading research institutions in the West. Institutions such as Memorial Sloan Kettering Cancer Center, Columbia University, University of Florida, Purdue University, Washington University in St. Louis, and the University of North Carolina at Chapel Hill consistently publish cutting-edge research on the synthesis and pharmacology of mitragynine analogs.[29] The presence of these big names in the academic and pharmaceutical world indicates a long-term and strategic effort by Western institutions to "unlock" the chemical secrets of kratom and claim them as their intellectual property.

3.3. The Primary Target: The Potency and Role of 7-Hydroxymitragynine

In the race to develop this new drug, 7-OH became the primary target due to its extraordinary potency. Various studies consistently show that 7-OH is significantly more potent than mitragynine (reportedly up to 46 times stronger) and even morphine (reportedly up to 13 times stronger) in producing analgesic effects.[13]

An even more crucial discovery is the role of mitragynine as a *prodrug*. Research shows that when mitragynine (the main alkaloid in the leaf) is consumed, a portion of it is metabolized by liver enzymes (specifically *cytochrome P450 3A*) into the much more active 7-OH.[29] It is this metabolite that is then responsible for most or all of the pain-relieving effects felt by the user. This discovery has enormous strategic implications: to control the analgesic effect of kratom, what needs to be controlled is 7-OH. This can be done in two ways: synthesizing 7-OH directly on a large scale, or creating new molecules (analogs) that mimic its structure. Both paths lead to a patentable product, unlike the natural kratom leaf.

The correlation between scientific advancements that increase the commercial value of kratom alkaloids and the intensification of regulatory pressure on the natural plant is not a coincidence. The following table visualizes the pattern that reveals the relationship between motive and action.

Table 2: Timeline of Pharmaceutical Research and Regulatory Scrutiny of Kratom Alkaloids (1994-Present)

Year	Key Scientific Discovery / Publication	Key Regulatory / Media Event
1994	7-Hydroxymitragynine (7-OH) is first described in the scientific literature.[13]	The kratom market in the West is still very limited and not a concern for regulators.
2002	Early studies on methods for synthesizing 7-OH from mitragynine are published, showing initial pharmaceutical interest.[34]	Interest in kratom begins to grow on online forums.
2010-2015	Significant increase in research. Calls to poison control centers related to kratom begin to rise in the US, signaling growing popularity.[27]	
2016	Crucial discovery that kratom alkaloids are "biased" agonists that do not recruit β-arrestin-2, making them a highly attractive drug target.[13]	The DEA announces its intention to classify kratom as a Schedule I substance, but withdraws after massive public and political protest.[28]
2017-2018	Further research confirms that mitragynine acts as a *prodrug* for the more potent 7-OH, clarifying the main molecular target for drug development.[29]	The FDA issues aggressive public health warnings, claiming kratom is an "opioid" and linking it to dozens of deaths, often without the context of polysubstance use.[28]
2019-Present	Proliferation of research at leading US universities to create and test new, patentable analogs of mitragynine and 7-OH.[37]	The market is flooded with semi-synthetic 7-OH products. The FDA begins issuing warning letters specifically targeting concentrated 7-OH products [18] and officially recommends that 7-OH be classified as a controlled substance.[21]

This timeline shows a clear pattern: every time a new scientific discovery successfully increases the commercial potential and viability of kratom alkaloids as patentable drug candidates, the regulatory pressure to ban or restrict access to the unpatentable natural plant—its direct competitor—also increases dramatically. This changes the narrative from a mere "public health" issue to a clear case of "economic warfare" driven by commercial interests.

PART IV

The Architecture of the Attack
Weaponizing Regulation and Media Narratives

With the economic motive behind the anti-kratom campaign exposed, the subsequent analysis focuses on the specific tactics used to execute the attack. The architecture of this attack is built on two main pillars: (1) the strategic manipulation of language and policy by regulatory bodies like the Food and Drug Administration (FDA) and the Drug Enforcement Administration (DEA) to create an ambiguous perception of danger, and (2) the creation of a "moral panic" by the mass media, which amplifies the crisis narrative without critical verification. This approach effectively weaponizes information and regulation to achieve a strategic goal: the total delegitimization of natural kratom.

4.1. The Art of Ambiguity: Deconstructing FDA and DEA Communications

A deep analysis of public documents issued by the FDA and DEA reveals a pattern of "strategic conflation." Although in some more recent communications (especially since 2025), the FDA explicitly states that its enforcement actions are focused on concentrated 7-OH products and *not* on natural kratom leaf, this statement is often tactical and contradictory to their broader and historical policies.[21]

Most fact sheets, press releases, and public warnings issued over the years consistently use the term "kratom" generically when discussing the most frightening risks such as addiction, psychosis, and death.[1] For example, a DEA fact sheet states that consumption of "kratom" can cause psychotic symptoms, including hallucinations, delusions, and confusion.[1] The FDA also broadly warns consumers not to use "kratom" due to the risk of liver toxicity, seizures, and substance use disorder.[16]

This ambiguity is not an oversight, but a deliberate strategy. By continuously associating the word "kratom" with extreme dangers that are actually only proven in highly potent semi-synthetic 7-OH products, these agencies have successfully created a blurred public perception. For the general public, the media, and even many policymakers, the crucial distinction between the natural leaf and its chemical derivative is lost. As a result, the entire image of the kratom plant is tainted by the sins of its industrial products, a result highly beneficial to those who want a total ban.

4.2. Manufacturing Moral Panic and the Counter-Narrative

The mass media plays a central role as an amplifier in this attack architecture. By applying the "moral panic" theory framework, it can be seen how the media actively participates in constructing

the "kratom crisis" narrative.[45] The media often acts as a mouthpiece for regulatory agencies, reporting FDA and DEA warnings uncritically and often with sensational language to attract readers.[46] This process creates what is called a "second-hand reality" for the public.[47] Most people have no direct experience with kratom, so their understanding is entirely shaped by what they read or see in the media. When the media consistently frames kratom in the context of crime, overdose, and addiction, often using dramatic and atypical examples, a negative public perception is formed.[47]

On the other side of this narrative war, resistance in the West is led by powerful consumer advocacy groups like the American Kratom Association (AKA). They effectively frame kratom not as a 'dangerous opioid,' but as a 'traditional herbal plant' and a vital 'harm reduction tool' in the fight against the actual opioid crisis.[41] Their struggle centers on narratives of individual liberty and the right to natural remedies, which successfully mobilized massive public and political opposition to the DEA's attempted ban in 2016.[28] Through intensive lobbying, the AKA has become the predominant force in pushing for state-level legislation via the 'Kratom Consumer Protection Act,' which focuses on quality regulation and labeling rather than an outright ban.[28] This creates a complex information battlefield in which Indonesia is an unwitting epicenter.

4.3. Deconstructing the "Kratom Deaths" Narrative

One of the most powerful narrative tools in creating moral panic is the claim of "deaths from kratom." However, a critical review of reports and systematic studies on deaths attributed to kratom reveals a much more complex and often misinterpreted story.

The most significant and consistent confounding variable is the simultaneous use of other substances (*polysubstance use*). A systematic review of 156 death cases attributed to kratom found that the absolute majority—87%—involved the use of various other substances.[51] These substances often included prescription opioids, heroin, fentanyl, benzodiazepines, and alcohol. In these cases, the causal role of kratom is highly unclear and often speculative.[16]

It is important to acknowledge that, like any other commodity, challenges such as misuse by a minority of the population and black market activities exist at the domestic level.[2] However, these internal challenges are fundamentally different from and should not be conflated with the engineered public health crisis in the West, which stems from semi-synthetic 7-OH products. This distinction is crucial to prevent domestic governance issues from being exploited as a justification for geopolitical intervention.

Even the FDA itself, in its official documents, acknowledges the weakness of this data. They state that in the reported death cases, kratom was "usually used in combination with other drugs, and the contribution of kratom in the deaths is unclear."[16] This admission is crucial, yet it is often buried in technical documents and rarely makes headlines. Instead, the simplified narrative—"Kratom Kills"—is constantly repeated. This is a classic example of the misuse of statistical data for propaganda purposes: ignoring complexity and confounding factors to create a simple and

effective narrative of fear.

The regulatory maneuver by the FDA shows a contradictory yet clever strategy. On one hand, in 2025, they openly stated that their actions are "not focused on natural kratom leaf products."[21] This is a tactical concession designed to appease the strong pro-kratom lobby and show that they are acting "reasonably."[43] However, on the other hand, the FDA simultaneously maintains its long-standing legal classification that kratom is an "unsafe food additive" and an "unapproved new dietary ingredient" that lacks adequate safety data.[16]

It is this broader legal classification that serves as the ultimate weapon. This status effectively makes the sale of natural kratom for human consumption in the US de facto illegal, regardless of the 7-OH issue. This gives the FDA the authority to conduct seizures, issue import alerts, and prosecute vendors at any time. Thus, the "distinction" between natural kratom and synthetic 7-OH is merely a public relations strategy, not a practical policy reality. The FDA is seemingly telling the public they are only going after the "bad guys" (synthetic products), while at the same time using their broader regulatory power to suppress the entire natural plant market. This two-pronged approach allows them to appear moderate while achieving the same end goal as a total ban: clearing the market.

PART V

The Geopolitical Endgame
Economic Warfare and the Seizure of Natural Resources

By piecing together all the evidence presented—the engineered crisis via "Trojan Horse" products, the massive economic motive of the pharmaceutical industry, and the weaponization of regulation and media—the big picture of this geopolitical endgame becomes clear. The kratom issue is not merely a debate about the health or safety of an herb. It is a modern case study of economic warfare, bioprospecting that leads to biopiracy, and a systematic effort to neutralize the sovereign industry of a developing nation to seize its economic value. The analysis in this section aims to "uncover the hidden geopolitical agenda," the pinnacle of the analytical methodology used.

5.1. The Pharmaceutical Industry as a Geopolitical Actor

To understand this context, we must first recognize the global pharmaceutical industry not just as a commercial entity, but as a very powerful geopolitical actor. With global annual revenues reaching USD 1.6 trillion in 2023, this sector has an economic power that surpasses the GDP of most countries in the world.[57] This power is not only economic but also political.

Their main instruments of power are intellectual property (patents) and international trade agreements like TRIPS (*Trade-Related Aspects of Intellectual Property Rights*).[58] This system, dominated by Western countries, is designed to protect monopolies on new drugs, allowing companies to set high prices and secure profits for decades. The kratom situation fits this pattern perfectly: an abundant, effective, unpatentable natural resource from a developing country (Indonesia) now threatens a market space that Western corporations are eager to dominate with patentable synthetic alternatives. The war against natural kratom is a war to maintain the supremacy of the patent-based business model.

5.2. Bioprospecting and Biopiracy: A Recurring Scenario in History

The intensive and focused research activity by Western academic institutions on kratom alkaloids can be accurately defined as *bioprospecting*: the systematic search for commercially valuable compounds from biological resources.[60] Although bioprospecting itself can be neutral, its current trajectory is rapidly leading to *biopiracy*: the appropriation of genetic resources and associated traditional knowledge without fair consent and without equitable benefit-sharing with the country and community of origin.

The ultimate goal of this Western research is not to partner with Indonesian farmers or to validate the use of traditional kratom leaf. Instead, the goal is to isolate, modify, synthesize, and ultimately patent its active molecules. Once these patents are secured, pharmaceutical companies will no

longer need kratom leaves from Indonesia. They will mass-produce the compounds in their own laboratories in their own countries. This is a classic scenario where the biological wealth of Southern countries is exploited to create high-tech products that are then sold back to the global market (including to the country of origin of the resource) at a premium price, while the local communities that have preserved the resource for centuries get nothing. Developing countries rich in biodiversity like Indonesia are very vulnerable to this practice, especially if their national legal framework to protect their genetic resources is still weak.[60]

5.3. Strategic Objective: Market Elimination and Replacement

Based on this analysis, the strategic objective of the anti-kratom campaign can be summarized in a clear and logical two-step process:

1. **Elimination of the Competitor:** Using the engineered "public health crisis" (driven by incidents from synthetic 7-OH) as justification to impose a de facto or de jure ban on all natural kratom products from Indonesia. This step will effectively eliminate a low-cost, effective, and unpatentable competitor from the massive global market for pain relief, mood enhancement, and opioid cessation aids. The supply chain that supports tens of thousands of Indonesian farmers will be severed.
2. **Introduction of a Patented Replacement:** Once the market is cleared of its natural competitor, the path becomes smooth for pharmaceutical companies to introduce their new, "FDA-approved," and patent-protected synthetic kratom analog products. They will successfully capture the entire market value previously held by the Indonesian grassroots economy, turning the "golden leaf" into corporate profit.

This battle over kratom is, in essence, a proxy battle in a larger geopolitical contest over control of global supply chains and the paradigm shift from natural/botanical products to centralized synthetic pharmaceutical manufacturing. Recent global crises, such as the COVID-19 pandemic and trade disputes, have exposed the fragility of global supply chains, triggering calls for "on-shoring" or "back-shoring" of critical manufacturing, including pharmaceuticals, back to Western countries.[64]

The Indonesian kratom industry represents the opposite model: a decentralized, agriculture-based supply chain rooted in local wisdom. It is the antithesis of the centralized, high-tech, and corporate-controlled Western pharmaceutical model. By destroying the natural kratom supply chain, Western interests not only eliminate a competitor but also reinforce the paradigm of centralized pharmaceutical control. They replace an agricultural commodity imported from Indonesia with a high-tech chemical synthesis process that can be located anywhere, most likely in America or Europe. Therefore, the attack on kratom is not just about one plant; it is a strategic move to ensure that the future of health and wellness remains in the hands of Western pharmaceutical producers, not in the fields of Southeast Asian farmers.

PART VI

Conclusion and Strategic Recommendations for National Sovereignty

This comprehensive analysis has dissected the complex and multifaceted layers of the threat to Indonesia's kratom industry. The conclusion is clear: Indonesia is not facing a genuine public health debate, but a sophisticated asymmetric economic warfare campaign, disguised as regulatory concern. A vital national economic asset and genetic resource is now a prime target. To counter this threat, a coordinated, proactive, and bold strategic response is required, aimed at defending national sovereignty on multiple fronts.

6.1. Summary of the Asymmetric Threat

The threat facing Indonesia is asymmetric. On one hand, Indonesia has the advantage of being the dominant producer of a globally demanded natural commodity. On the other hand, the adversary uses instruments of power that Indonesia does not possess: control over influential international regulatory bodies (FDA), dominance of the narrative in global media, and supremacy in high-tech pharmaceutical research and development.

The attack is launched through:

- **Crisis Creation:** Infiltrating the market with dangerous semi-synthetic 7-OH products to create exploitable health incidents.
- **Information Warfare:** Using strategic ambiguity by regulators and sensationalist framing by the media to conflate the dangers of synthetic products with the image of natural kratom.
- **Hidden Economic Motives:** A long-term pursuit by the pharmaceutical industry to eliminate an unpatentable competitor and replace it with highly profitable patented synthetic drugs.
- **Geopolitical Goals:** Seizing control over genetic resources and global supply chains, reinforcing the centralized Western pharmaceutical model and weakening the commodity-based economies of developing nations.

This assault is, in essence, an attack on the foundational pillars of the Nusantara civilization. It not only threatens the pillars of **Economy** (wisdom-based welfare) and **Knowledge** (indigenous science), but also undermines the **Social Order** of farming communities, challenges the nation's **Political** sovereignty over its own resources, and erodes the right to a **Personal Order** rooted in the wisdom of traditional medicine.

6.2. Strategic Recommendations

Based on this analysis, here is a series of strategic recommendations designed to build a robust national defense and reclaim control over the narrative and future of Indonesia's kratom industry.

Legal and Diplomatic Front:

1. **Intervention at the International Level:** The Indonesian government must proactively engage with international organizations such as the World Health Organization (WHO) and the UN Commission on Narcotic Drugs (CND). Indonesia must present strong, independent scientific data to challenge the flawed and generalized claims made by the FDA, emphasizing the fundamental difference between natural kratom leaf and synthetic 7-OH.
2. **Leveraging International Law:** Explore legal action or complaints under international agreements such as the Nagoya Protocol on Access and Benefit-Sharing. The main argument is that the intensive research by Western institutions on kratom alkaloids constitutes an unregulated act of bioprospecting, potentially violating Indonesia's sovereign rights over its genetic resources.
3. **Forming a Regional Alliance:** Initiate the formation of a coalition with other kratom-producing countries in Southeast Asia, such as Malaysia and Thailand (which recently decriminalized kratom). A united diplomatic front will carry far greater weight in international forums to counter regulatory pressure from the West.

Regulatory and Scientific Front:

1. **Establish an Indonesian National Standard (SNI) for Kratom:** Immediately develop and enforce strict national quality standards for kratom exports. This SNI must include mandatory purity testing for heavy metals and microbial contaminants, a detailed alkaloid profile, and, most importantly, a very low maximum limit for 7-OH content. This standard will serve as a preemptive weapon, refuting Western claims of "unsafe" or "unregulated" Indonesian products and positioning Indonesia as a leader in quality and safety.
2. **Lead Global Scientific Research:** Allocate significant funding for research led by Indonesian institutions (universities, BRIN, Ministry of Health) to definitively document the safety profile, pharmacology, and therapeutic potential of the *whole kratom leaf*. The research focus should shift from merely isolating alkaloids (as the West does) to understanding the synergistic effects of the entire plant's components. The results of this research must be published in leading international journals to create a credible body of counter-evidence.
3. **Fund Comparative Research:** Specifically fund and publish head-to-head studies comparing the pharmacological and toxicological profiles of natural kratom leaf, traditional kratom tea, and the concentrated 7-OH products sold in the West. Such studies will provide irrefutable scientific evidence of the risk differences between these products.

Economic and Information Front:

1. **Launch a Global Strategic Communications Campaign:** The government, through its embassies, trade ministries, and industry associations, must launch a targeted global information campaign. The goal is to educate consumers, policymakers, and the media in export destination countries about the vital difference between safe, natural Indonesian kratom and dangerous, synthetic 7-OH products. This campaign must use data from the SNI and Indonesian scientific research as its foundation.
2. **Empower Farmers and Improve Cultivation Practices:** Provide support and incentives for kratom farmers to adopt sustainable farming and *Good Agricultural Practices* (GAP).[5] This will not only improve product quality and safety but also strengthen the marketing narrative of Indonesian kratom as natural, ethical, and environmentally friendly.
3. **Build the "Indonesian Kratom" Brand:** Develop a national branding strategy that positions kratom from Indonesia as the world's premium product. This brand should emphasize its authentic origins, its history of traditional use, and its quality assurance through the SNI. This is a battle to reclaim "Sovereignty of Thought," changing the perception from a "dangerous substance" to "Indonesia's superior botanical heritage."

By implementing this multi-pronged strategy, Indonesia can shift from a reactive to a proactive position, not only defending a vital industry but also asserting its sovereignty over its natural resources and its economic future.

BIBLIOGRAPHY

1. https://www.dea.gov/sites/default/files/2020-06/Kratom-2020_0.pdf
2. (https://www.aadk.gov.my/wp-content/uploads/Socio-economic-issues-of-Kratom-A-Qualitative-Study.pdf)
3. https://patents.google.com/patent/CN106967067A/en
4. https://srhformosapublisher.org/index.php/fjas/article/download/234/344
5. https://www.ralali.com/indonesia-supplier/kratom/kratom-producing-regions-in-indonesia/
6. https://www.ibai.or.id/news/item/7045-indonesian-kratom-thrives-in-u-s-market-exports-reach-usd-350-million.html
7. https://indonesia.go.id/kategori/keanekaragaman-hayati/9060/potensi-ekonomi-dan-polemik-khasiat-daun-kratom?lang=1
8. https://www.kemendag.go.id/berita/pojok-media/mendag-ungkap-tanaman-kratom-belum-bisa-dijual-di-dalam-negeri-tapi-bisa-diekspor
9. https://english.news.cn/20250228/20dd96f3fd2e4509a86ba27a7b332622/c.html
10. https://www.researchgate.net/publication/351429832_Kratom_A_systematic_review_of_toxicological_issues
11. https://pmc.ncbi.nlm.nih.gov/articles/PMC10648626/
12. https://www.dea.gov/factsheets/kratom
13. https://en.wikipedia.org/wiki/7-Hydroxymitragynine
14. https://www.fda.gov/news-events/public-health-focus/fda-and-kratom
15. https://pmc.ncbi.nlm.nih.gov/articles/PMC5135684/
16. https://www.fda.gov/media/187899/download
17. https://www.unodc.org/LSS/Announcement/Details/d0c66623-b200-4537-9f25-7df89fbdbf8b
18. https://www.fda.gov/news-events/press-announcements/fda-issues-warning-letters-firms-marketing-products-containing-7-hydroxymitragynine
19. https://www.dshs.texas.gov/news-alerts/serious-illnesses-associated-7-oh-use
20. https://www.fda.gov/news-events/press-announcements/fda-takes-steps-restrict-7-oh-opioid-products-threatening-american-consumers
21. https://www.fda.gov/consumers/consumer-updates/products-containing-7-oh-can-cause-serious-harm
22. https://www.fda.gov/media/187898/download
23. https://www.mdpi.com/2227-9075/2/2/253
24. https://www.wjgnet.com/2220-3192/full/v11/i3/16.htm
25. https://pmc.ncbi.nlm.nih.gov/articles/PMC6598159/
26. https://www.frontiersin.org/journals/pharmacology/articles/10.3389/fphar.2021.764885/full
27. https://legislativeanalysis.org/wp-content/uploads/2019/10/Kratom-Fact-Sheet-1.pdf
28. https://pmc.ncbi.nlm.nih.gov/articles/PMC8219695/
29. https://pmc.ncbi.nlm.nih.gov/articles/PMC5344672/
30. https://www.researchgate.net/publication/11406009_Studies_on_the_Synthesis_and_Opioid_Agonistic_Activities_of_Mitragynine-Related_Indole_Alkaloids_Discovery_of_Opioid_Agonists_Structurally_Different_from_Other_Opioid_Ligands
31. https://www.biorxiv.org/content/10.1101/2021.04.22.440994v2.full-text
32. https://pmc.ncbi.nlm.nih.gov/articles/PMC8530377/
33. https://pubs.acs.org/doi/10.1021/acs.jmedchem.1c01273

34. https://www.frontiersin.org/journals/pharmacology/articles/10.3389/fphar.2021.729220/full
35. https://pmc.ncbi.nlm.nih.gov/articles/PMC7203303/
36. https://www.pbs.org/newshour/nation/hhs-recommended-that-the-dea-make-kratom-a-schedule-i-drug-like-lsd-or-heroin
37. https://www.hopkinsmedicine.org/news/newsroom/news-releases/2020/02/natural-herb-kratom-may-have-therapeutic-effects-and-relatively-low-potential-for-abuse-or-harm-according-to-a-user-survey
38. https://nida.nih.gov/research-topics/kratom
39. https://www.fda.gov/news-events/fda-brief/fda-brief-fda-objects-kratom-compound-intended-use-alternative-prescription-opioids-and-promoted
40. https://www.pbs.org/newshour/health/u-s-health-officials-cracking-down-on-kratom-related-products
41. https://www.researchgate.net/publication/332591666_A_Mild_Panic_Media_Accounts_of_Kratom
42. https://www.shs-conferences.org/articles/shsconf/pdf/2023/04/shsconf_sdmc2022_01022.pdf
43. https://opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=2165&context=gs_rp
44. https://www.researchgate.net/publication/383597932_Health_Benefits_and_Adverse_Effects_of_Kratom_A_Social_Media_Text-Mining_Approach
45. https://www.researchgate.net/publication/335288671_Characteristics_of_deaths_associated_with_kratom_use
46. https://openresearch.surrey.ac.uk/esploro/outputs/journalArticle/Characteristics-of-deaths-associated-with-kratom/99889439002346
47. https://uhra.herts.ac.uk/id/eprint/7876/1/Characteristics_of_deaths_associated_with_kratom_use_JP_final_version_accepted_17_June_2019.pdf
48. https://www.semanticscholar.org/paper/c1a97e847fcc8eec90c3e842e07a2ebc6e2cd6ed
49. https://kslegislature.gov/li_2024/b2023_24/committees/ctte_h_fed_st_1/documents/testimony/20230201_16.pdf
50. https://www.researchgate.net/publication/373141405_Effects_of_Geopolitical_Strain_on_Global_Pharmaceutical_Supply_Chain_Design_and_Drug_Shortages
51. https://osf.io/z5mf6/download/
52. https://www.researchgate.net/publication/387724614_Power_Disputes_and_Geopolitics_in_the_Pharmaceutical_Sector
53. https://emmainternational.com/the-geopolitical-chessboard-how-geopolitics-influences-the-pharmaceutical-industry/
54. https://openresearch-repository.anu.edu.au/items/87993957-4547-4133-a544-aa74c6b62744
55. https://www.iddri.org/sites/default/files/import/publications/study0613_cc-rl-rp_bioprospecting.pdf
56. https://meridian.allenpress.com/australian-zoologist/book/600/chapter/12049689/Potential-conservation-benefits-and-problems
57. https://www.embopress.org/doi/full/10.1093/embo-reports/kve077
58. https://www.tandfonline.com/doi/full/10.1080/09537287.2023.2286283
59. https://healthpolicy.duke.edu/publications/building-resilient-and-secure-pharmaceutical-supply-chain-role-geographic
60. https://www.protectkratom.org/

61. https://news.cuanschutz.edu/news-stories/balancing-kratoms-potential-benefits-and-risks
62. https://pmc.ncbi.nlm.nih.gov/articles/PMC8860177/
63. https://www.unodc.org/LSS/Announcement/Details/d0c66623-b200-4537-9f25-7df89fbdbf8b
64. https://www.fda.gov/news-events/press-announcements/fda-issues-warning-letters-firms-marketing-products-containing-7-hydroxymitragynine
65. https://www.dshs.texas.gov/news-alerts/serious-illnesses-associated-7-oh-use
66. https://www.fda.gov/news-events/press-announcements/fda-takes-steps-restrict-7-oh-opioid-products-threatening-american-consumers
67. https://www.fda.gov/consumers/consumer-updates/products-containing-7-oh-can-cause-serious-harm
68. https://www.fda.gov/media/187898/download

Works cited

1. Drug Fact Sheet: Kratom - DEA.gov, accessed October 11, 2025, https://www.dea.gov/sites/default/files/2020-06/Kratom-2020_0.pdf
2. Socio-economic issues of Kratom: A Qualitative Study, accessed October 11, 2025, https://www.aadk.gov.my/wp-content/uploads/Socio-economic-issues-of-Kratom-A-Qualitative-Study.pdf
3. CN106967067A - A kind of method for preparing 7 hydroxyl ..., accessed October 11, 2025, https://patents.google.com/patent/CN106967067A/en
4. State Intelligence Strategy in Facing Transnational Threats from Kratom Plant Abuse in Indonesia, accessed October 11, 2025, https://srhformosapublisher.org/index.php/fjas/article/download/234/344
5. Kratom-Producing Regions in Indonesia - Ralali.com, accessed October 11, 2025, https://www.ralali.com/indonesia-supplier/kratom/kratom-producing-regions-in-indonesia/
6. Indonesian Kratom Thrives in U.S. Market, Exports Reach USD 350 Million, accessed October 11, 2025, https://www.ibai.or.id/news/item/7045-indonesian-kratom-thrives-in-u-s-market-exports-reach-usd-350-million.html
7. Potensi Ekonomi dan Polemik Khasiat Daun Kratom - Indonesia.go.id, accessed October 11, 2025, https://indonesia.go.id/kategori/keanekaragaman-hayati/9060/potensi-ekonomi-dan-polemik-khasiat-daun-kratom?lang=1
8. Indonesia exports 1st shipment of processed kratom to U.S., Europe under new export regulation - Xinhua, accessed October 11, 2025, https://english.news.cn/20250228/20dd96f3fd2e4509a86ba27a7b332622/c.html
9. Mendag Ungkap Tanaman Kratom Belum Bisa Dijual di Dalam Negeri, tapi Bisa Diekspor, accessed October 11, 2025, https://www.kemendag.go.id/berita/pojok-media/mendag-ungkap-tanaman-kratom-belum-bisa-dijual-di-dalam-negeri-tapi-bisa-diekspor
10. Kratom: A systematic review of toxicological issues | Request PDF - ResearchGate, accessed October 11, 2025, https://www.researchgate.net/publication/351429832_Kratom_A_systematic_review_of_toxicological_issues
11. Kratom: a systematic review of toxicological issues - SafetyLit, accessed October 11, 2025, https://www.safetylit.org/citations/index.php?fuseaction=citations.viewdetails&citationIds[]=citjournalarticle_745132_1
12. Kratom - DEA.gov, accessed October 11, 2025, https://www.dea.gov/factsheets/kratom
13. 7-Hydroxymitragynine - Wikipedia, accessed October 11, 2025, https://en.wikipedia.org/wiki/7-Hydroxymitragynine
14. Exploring the Therapeutic Potential of Mitragynine and Corynoxeine: Kratom-Derived Indole and Oxindole Alkaloids for Pain Management - MDPI, accessed October 11, 2025, https://www.mdpi.com/1424-8247/18/2/222
15. 7-Hydroxymitragynin (7-OH): An Assessment of the Scientific Data and Toxicological Concerns Around an Emerging Opioid Threat - FDA, accessed October 11, 2025, https://www.fda.gov/media/187899/download
16. FDA and Kratom, accessed October 11, 2025, https://www.fda.gov/news-events/public-health-focus/fda-and-kratom

17. August 2025 - Emergence of potent kratom-related products containing 7-hydroxymitragynine and/or mitragynine pseudoindoxyl - Unodc, accessed October 11, 2025, https://www.unodc.org/LSS/Announcement/Details/d0c66623-b200-4537-9f25-7df89fbdbf8b
18. FDA Issues Warning Letters to Firms Marketing Products Containing 7-Hydroxymitragynine, accessed October 11, 2025, https://www.fda.gov/news-events/press-announcements/fda-issues-warning-letters-firms-marketing-products-containing-7-hydroxymitragynine
19. Serious Illnesses Associated with 7-OH Use | Texas DSHS, accessed October 11, 2025, https://www.dshs.texas.gov/news-alerts/serious-illnesses-associated-7-oh-use
20. FDA Issues Warning Letters to Crack Down on Kratom-Derived Opioid Products - The Ohio Council, accessed October 11, 2025, https://obc.memberclicks.net/index.php?option=com_content&view=article&id=7143:fda-issues-warning-letters-to-crack-down-on-kratom-derived-opioid-products&catid=29:insight&Itemid=252
21. FDA Takes Steps to Restrict 7-OH Opioid Products Threatening ..., accessed October 11, 2025, https://www.fda.gov/news-events/press-announcements/fda-takes-steps-restrict-7-oh-opioid-products-threatening-american-consumers
22. July 29, 2025 Dear Colleague, I am writing to warn you about an opioid that few physicians may be aware of. It's called 7- h - FDA, accessed October 11, 2025, https://www.fda.gov/media/187898/download
23. Suspected Adulteration of Commercial Kratom Products with 7-Hydroxymitragynine - PMC, accessed October 11, 2025, https://pmc.ncbi.nlm.nih.gov/articles/PMC5135684/
24. Products Containing 7-OH Can Cause Serious Harm - FDA, accessed October 11, 2025, https://www.fda.gov/consumers/consumer-updates/products-containing-7-oh-can-cause-serious-harm
25. Controversial usages of kratom (Mitragyna speciosa): For good or for evil, accessed October 11, 2025, https://www.wjgnet.com/2220-3192/full/v11/i3/16.htm
26. Kratom | National Institute on Drug Abuse (NIDA), accessed October 11, 2025, https://nida.nih.gov/research-topics/kratom
27. Kratom—Pharmacology, Clinical Implications, and Outlook: A Comprehensive Review, accessed October 11, 2025, https://pmc.ncbi.nlm.nih.gov/articles/PMC7203303/
28. Regulation of Kratom in America - Legislative Analysis and Public Policy Association, accessed October 11, 2025, https://legislativeanalysis.org/wp-content/uploads/2019/10/Kratom-Fact-Sheet-1.pdf
29. 7-Hydroxymitragynine Is an Active Metabolite of Mitragynine and a Key Mediator of Its Analgesic Effects | ACS Central Science, accessed October 11, 2025, https://pubs.acs.org/doi/abs/10.1021/acscentsci.9b00141?__cf_chl_jschl_tk__=6adb3e4c55b7d877fc23a0ae16cbbe85e6389f98-1614594374-0-AfXwXTV3bJVuJkPynPGwToyTiHaQRMWTu71HpFKGc3qzYiPhG1w8Pppl4UlxWbtbMTQFzb8f5z3VM7u2bz1ON60AssN4llKOpsLe_WeoPBqO7emLfEkfdlQ42dlj316MciHXCq6Hl_xAdxzO7UVFzRvbaBiyoun1D8F5HdW8ugUkPaI1pPKH3shgTt7_ztlRlfMaXDMu8jfd9vPlYLFh62ABsh0aPZcZ8gQxfdBPY-S9ShrhyjYehHfscrUMKDX-G2Mseeg3p7A-_CZg71kEHll-z5KlV-Hza2eeMGpumUCvXfnc1NsbQvDbVOHCUvUSQCLXZL3_Srj_BBmZ5_rk6nyapeIxRDxOLCTyGDRe2Uwh

30. Site selective C–H functionalization of Mitragyna alkaloids reveals a ..., accessed October 11, 2025, https://pmc.ncbi.nlm.nih.gov/articles/PMC8219695/
31. Mitragynine/Corynantheidine Pseudoindoxyls As Opioid Analgesics with Mu Agonism and Delta Antagonism, Which Do Not Recruit β-Arrestin-2 - PubMed Central, accessed October 11, 2025, https://pmc.ncbi.nlm.nih.gov/articles/PMC5344672/
32. Evaluation of Kratom Opioid Derivatives as Potential ... - Frontiers, accessed October 11, 2025, https://www.frontiersin.org/journals/pharmacology/articles/10.3389/fphar.2021.764885/full
33. 7-Hydroxymitragynine Is an Active Metabolite of Mitragynine and a Key Mediator of Its Analgesic Effects | ACS Central Science, accessed October 11, 2025, https://pubs.acs.org/doi/10.1021/acscentsci.9b00141
34. Studies on the Synthesis and Opioid Agonistic Activities of Mitragynine-Related Indole Alkaloids: Discovery of Opioid Agonists Structurally Different from Other Opioid Ligands | Request PDF - ResearchGate, accessed October 11, 2025, https://www.researchgate.net/publication/11406009_Studies_on_the_Synthesis_and_Opioid_Agonistic_Activities_of_Mitragynine-Related_Indole_Alkaloids_Discovery_of_Opioid_Agonists_Structurally_Different_from_Other_Opioid_Ligands
35. patents.google.com, accessed October 11, 2025, https://patents.google.com/patent/CN106967067A/en#:~:text=Our%20research%20group%20found%20that,7%2Dhydroxy%20mitragynine%20with%20a
36. 7-Hydroxymitragynine Is an Active Metabolite of Mitragynine and a Key Mediator of Its Analgesic Effects - PubMed Central, accessed October 11, 2025, https://pmc.ncbi.nlm.nih.gov/articles/PMC6598159/
37. A Novel Mitragynine Analog with Low-Efficacy Mu Opioid Receptor Agonism Displays Antinociception with Attenuated Adverse Effects, accessed October 11, 2025, https://pmc.ncbi.nlm.nih.gov/articles/PMC8530377/
38. What is Kratom? Kratom refers to a pharmacologically complex and diverse botanical, Mitragynia speciosa, that is native to Southeast Asia. Kratom leaves have dozens of bioactive alkaloids with serotonergic, alpha-adrenergic, adenosinergic, and opioidergic activity. A number of commercial products have now been derived from kratom leaves and are sold in the - #Maryland Opioid Research (MOR), accessed October 11, 2025, https://marylandopioidresearch.com/home/kratomresearchunit/
39. A novel mitragynine analog with low efficacy mu-opioid receptor agonism displays antinociception with attenuated adverse effects | bioRxiv, accessed October 11, 2025, https://www.biorxiv.org/content/10.1101/2021.04.22.440994v2.full-text
40. A Novel Mitragynine Analog with Low-Efficacy Mu Opioid Receptor Agonism Displays Antinociception with Attenuated Adverse Effects | Journal of Medicinal Chemistry - ACS Publications, accessed October 11, 2025, https://pubs.acs.org/doi/10.1021/acs.jmedchem.1c01273
41. Kratom Use Within the Context of the Evolving Opioid Crisis and the COVID-19 Pandemic in the United States - Frontiers, accessed October 11, 2025, https://www.frontiersin.org/journals/pharmacology/articles/10.3389/fphar.2021.729220/full
42. HHS recommended that the DEA make kratom a Schedule I drug, like LSD or heroin - PBS,

accessed October 11, 2025, https://www.pbs.org/newshour/nation/hhs-recommended-that-the-dea-make-kratom-a-schedule-i-drug-like-lsd-or-heroin
43. WATCH: RFK Jr. and health officials announced crackdown on kratom-related products, accessed October 11, 2025, https://www.pbs.org/newshour/health/u-s-health-officials-cracking-down-on-kratom-related-products
44. Kratom - DEA.gov, accessed October 11, 2025, https://www.dea.gov/taxonomy/term/101
45. A Mild Panic? Media Accounts of Kratom | Request PDF - ResearchGate, accessed October 11, 2025, https://www.researchgate.net/publication/332591666_A_Mild_Panic_Media_Accounts_of_Kratom
46. Kratom: Unsafe and ineffective - Mayo Clinic, accessed October 11, 2025, https://www.mayoclinic.org/diseases-conditions/prescription-drug-abuse/in-depth/kratom/art-20402171
47. Media Framing of Drug Crises in the United States - OpenSIUC, accessed October 11, 2025, https://opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=2165&context=gs_rp
48. A Study Media Coverage of College Crisis under Framing Theory - SHS Web of Conferences, accessed October 11, 2025, https://www.shs-conferences.org/articles/shsconf/pdf/2023/04/shsconf_sdmc2022_01022.pdf
49. Kratom Abuse Potential 2021: An Updated Eight Factor Analysis - PMC - PubMed Central, accessed October 11, 2025, https://pmc.ncbi.nlm.nih.gov/articles/PMC8860177/
50. As dangerous kratom products go unregulated, lobbyists write the laws | Tampa Bay Times, accessed October 11, 2025, https://project.tampabay.com/investigations/deadly-dose/american-kratom-association-lobbyists-fda-florida/
51. Characteristics of deaths associated with kratom use | Request PDF, accessed October 11, 2025, https://www.researchgate.net/publication/335288671_Characteristics_of_deaths_associated_with_kratom_use
52. Characteristics of deaths associated with kratom use Authors: John M. Corkery1#, Peter Streete2, Hugh Claridge3, Christine Gooda - University of Hertfordshire Research Archive, accessed October 11, 2025, https://uhra.herts.ac.uk/id/eprint/7876/1/Characteristics_of_deaths_associated_with_kratom_use_JP_final_version_accepted_17_June_2019.pdf
53. Characteristics of deaths associated with kratom use - University of Surrey, accessed October 11, 2025, https://openresearch.surrey.ac.uk/esploro/outputs/journalArticle/Characteristics-of-deaths-associated-with-kratom/99889439002346
54. Forensic Implications of Kratom: Kratom Toxicity, Correlation with Mitragynine Concentrations, and Polypharmacy | Semantic Scholar, accessed October 11, 2025, https://www.semanticscholar.org/paper/c1a97e847fcc8eec90c3e842e07a2ebc6e2cd6ed
55. LEGAL & REGULATORY Kratom Crackdown: FDA Intensifies Warnings with Limited, Inconclusive Data - BVS, accessed October 11, 2025, https://docs.bvsalud.org/biblioref/2019/02/980298/kratom-crackdown-fda-intensifies-warnings-with-limited-inconclu_AXMQ2ec.pdf
56. Balancing Kratom's Potential Benefits And Risks - CU Anschutz newsroom, accessed

October 11, 2025, https://news.cuanschutz.edu/news-stories/balancing-kratoms-potential-benefits-and-risks
57. Power, Disputes, and Geopolitics in the Pharmaceutical Sector - OSF, accessed October 11, 2025, https://osf.io/z5mf6/download/
58. (PDF) Power, Disputes, and Geopolitics in the Pharmaceutical Sector - ResearchGate, accessed October 11, 2025, https://www.researchgate.net/publication/387724614_Power_Disputes_and_Geopolitics_in_the_Pharmaceutical_Sector
59. How Geopolitics Influences the Pharmaceutical Industry - EMMA International, accessed October 11, 2025, https://emmainternational.com/the-geopolitical-chessboard-how-geopolitics-influences-the-pharmaceutical-industry/
60. Marine bioprospecting: international law, Indonesia and sustainable development, accessed October 11, 2025, https://openresearch-repository.anu.edu.au/items/87993957-4547-4133-a544-aa74c6b62744
61. Biodiversity conservation: How can the regulation of bioprospecting under the Nagoya Protocol make a difference? - | IDDRI, accessed October 11, 2025, https://www.iddri.org/sites/default/files/import/publications/study0613_cc-rl-rp_bioprospecting.pdf
62. Potential conservation benefits and problems associated with bioprospecting in the marine environment | A Zoological RevolutionUsing native fauna to assist in its own survival | Australian Zoologist - Allen Press, accessed October 11, 2025, https://meridian.allenpress.com/australian-zoologist/book/600/chapter/12049689/Potential-conservation-benefits-and-problems
63. Cashing in on nature's pharmacy: Bioprospecting and protection of, accessed October 11, 2025, https://www.embopress.org/doi/full/10.1093/embo-reports/kve077
64. Building a Resilient and Secure Pharmaceutical Supply Chain: The Role of Geographic Diversification - Duke-Margolis Institute for Health Policy, accessed October 11, 2025, https://healthpolicy.duke.edu/publications/building-resilient-and-secure-pharmaceutical-supply-chain-role-geographic
65. (PDF) Effects of Geopolitical Strain on Global Pharmaceutical Supply Chain Design and Drug Shortages - ResearchGate, accessed October 11, 2025, https://www.researchgate.net/publication/373141405_Effects_of_Geopolitical_Strain_on_Global_Pharmaceutical_Supply_Chain_Design_and_Drug_Shortages
66. Geopolitical disruptions in global supply chains: a state-of-the-art literature review, accessed October 11, 2025, https://www.tandfonline.com/doi/full/10.1080/09537287.2023.2286283